The following comments were prepared by Metcalf & Eddy, USEPA consultants, and were designated as Enclosure I of the USEPA Comments.

EXECUTIVE SUMMARY COMMENTS

(Comment numbers 1 through 14 (Executive Summary Comments) are addressed in subsequent responses as indicated).

1. **Executive Summary, Page ES-4, Paragraph 2:** In the report, the classification review area (CRA) was subdivided into two groundwater zones, an unconfined and a confined aquifer. It could be appropriate to subdivide the CRA into three units instead of two because of the sand lens present at the property's south end. The uppermost water-bearing zone could be further subdivided into two units, the weathered till zone and the unweathered till zone containing the sand lens under confining pressure. Perhaps the confined sand lens could also be considered as a third, separate groundwater unit. Please see comment on Section 4.2.4.1, Page 4-35, Paragraph 2 for further detail.

See comment number 46.

2. **Executive Summary, Page ES-5, Paragraph 1:** The potential for releases through air should be considered as a contaminant pathway because wind-blown dusts may result in exposure to workers on-site or residents in the site vicinity to contaminated soils by dermal contact or inhalation of fugitive dusts.

See comment numbers 102, 124, and 127.

3. **Executive Summary, Page ES-5, Paragraph 3:** The report states that discharge from shallow to deep groundwater is highly unlikely. However, elevated concentrations of barium were detected in bedrock groundwater samples, including "background" well 11D, and barium is one of the major waste constituents at the RMI Sodium plant. Therefore, the presence of barium in deep groundwater may indicate that there may be some type of

connection between shallow and deep groundwater. Also, because high barium concentrations were detected in "background" well 11D, this well may not actually represent background conditions. These scenarios should be more adequately addressed in the report.

See comment numbers 72 and 73.

4. Executive Summary, Page ES-6, Paragraph 1: If the barium detected in groundwater from the deep wells is site-related, then an assessment of exposure to site constituents via the groundwater pathway should be performed, especially if the domestic well located 3.8 kilometers northeast of the site is found to be used as a source of drinking water. Also, the potential for future users of shallow groundwater should be addressed although there are no present receptors of shallow groundwater near the site.

See comment numbers 110, and 112 through 115.

5. Executive Summary, Page ES-6, Paragraph 2: It is possible that the consistent arsenic concentrations throughout the subsurface is the result of leaching by rainwater carrying the arsenic to deeper intervals. As stated on Page 7-31, arsenic has the least potential for sorption or attenuation onto soils and thus could migrate consistently deeper in solution than possible for other constituents.

See comment number 120.

6. Executive Summary, Page ES-7, Paragraph 1: The report states that "leaching of subsurface soils is not likely to occur to a significant degree." Please better elaborate on what is meant by "a significant degree".

See comment number 123. Because Sections 1 through 6 of the RFI will be revised and reissued and Section 7 (for which this comment is relevant) will be revised and reissued with the CMS Work Plan, this comment is no

longer relevant to the Executive Summary for the RFI. However, sections of (previous) Section 7 will be revised, as appropriate to satisfy the intent of this comment. For example, it will be clarified that subsurface soils did not contain constituents in excess of EP Toxicity Maximum Contaminant Concentrations for the CMS Work Plan.

7. Executive Summary, Page ES-7, Paragraph 2: Again, on-site employees may be exposed to contaminated soil by dermal contact or inhalation of wind-blown dusts. Therefore, comparison to exposure criteria may be appropriate.

See comment numbers 102, 124, and 127.

8. Executive Summary, Page ES-8, Paragraph 1: The possible source of zinc in the surface water sample (DW-E) needs to be more adequately addressed if an off-site source is postulated.

See comment number 134.

9. Executive Summary, Page ES-8, Paragraph 2: Although solubilities of constituents indicated that sorption was likely to be rather significant, runoff of contaminated sediments to the ditch constitutes a release to the environment that may affect any aquatic species that inhabit the downstream water courses (DS Tributary, Fields Brook, Cuyahoga River, and Lake Erie). Heavy rainfall and flooding events would increase runoff of contaminated sediments to the ditch and easily transport the sediments downstream during high water flow. The collection and analyses of both ditch sediment samples at intervals downstream and surface water samples during or closely following a heavy rainfall event would assist in determining whether this scenario is occurring or has occurred.

See comment number 98.

10. **Executive Summary, Page ES-8, Paragraph 3: The last sentence states that the behavior of lead was inconclusive when comparing concentrations measured in ditch water samples with nearby surficial soil concentrations. Perhaps this relationship should be further investigated.**

As discussed in Section 7.3.2.2, page 7-76, paragraph 1, because the lead concentrations in the drainage ditch water relative to concentrations in nearby surficial soils were not as expected in samples DW-D and DW-E, and because these locations are in the portion of the drainage ditch that originates from off site east of the RMI property, the contribution of lead from off site sources is suggested. Because Sections 1 through 6 of the RFI will be revised and reissued and Section 7 (for which this comment is relevant) will be revised and reissued with the CMS Work Plan, this comment is no longer relevant to the Executive Summary for the RFI. However, sections of (previous) Section 7 will be revised, as appropriate to satisfy the intent of this comment. For example, it will be clarified that cadmium was usually detected in water at low concentrations when it was present in soil, and although concentrations of lead in water versus nearby surficial soils varied, and it is possible that lead has been contributed from off site sources for the CMS Work Plan.

11. **Executive Summary, Page ES-9, Paragraph 1: This paragraph contains several subjective conclusions which need to be further addressed. These subjective conclusions include "..extremely tolerant lower aquatic species possibly present in downstream Fields Brook", "..DS Tributary was not believed to be capable of supporting fish or higher forms of aquatic species", and "..was not determined to be significant, as it is highly unlikely that the DS Tributary would meet the requirements.." In addition, this paragraph seems to imply that any contaminants released from the site to the surface water are not of concern because the "only likely environmental receptors were determined to be extremely tolerant lower aquatic species possibly present in downstream Fields Brook."**

However, for purposes of this RFI, the fact is that releases of site contaminants may impact media (water, sediment) and aquatic species.

See comment number 140.

12. Executive Summary, Page ES-9, Paragraph 1: The concentration of cadmium (2.1 ppb) found to be above the Ohio Warm Water Habitat Standard may be significant, especially if the DS Tributary does meet the requirements for an Ohio Warm Water Habitat (Cd standard of 1.9 ppb).

As discussed in Sections 7.3.3, 7.3.4, 7.3.5, of the RFI report and in the meeting of May 9, the difference between the measured value at DW-G (2.1 ppb) and the Ohio water quality value (1.9 ppb) is considered to be negligible. Also, it is not believed that the warm water habitat designation is appropriate for the DS Tributary because it is doubtful that the waters are capable of supporting any but the most tolerant species of aquatic biota. The Ohio Water Quality Standards do not mention the application of the use designations to tributaries. However, because of the size, depth and flow rates of the DS Tributary, it is reasonable to expect that the water use designations realistically only apply at the point where the tributary joins Fields Brook. The DS Tributary is not of sufficient depth or flow to support many higher species of aquatic biota. Indeed, no aquatic biota were observed in any of the site drainage ditches, including the DS Tributary during the RFI.

13. Executive Summary, Page ES-9, Paragraph 3: Please see the comment for Section 6.6.6, Pages 6-34 and 6-35 for detailed comments on the conclusions about the dense non-aqueous phase liquid (DNAPL) source stated in this paragraph.

See comment number 95.

14a. Executive Summary, Page ES-10, Paragraph 1: Further investigations should also include better determining the origin of the DNAPL identified in the groundwater at the southern site boundary. The installation of piezometers and/or wells on the southern side of the ditch would be warranted. Additional soil borings are needed to determine the extent of the sand lens south of the site and north into the site. If the sand lens is encountered in any boring and groundwater is present, then a monitoring well could be installed and screened at the sand lens interval.

See comment number 95.

Comment

14b. Other investigations at the site should possibly include the collection of sediment samples along downstream intervals of the ditch. Groundwater samples should be collected and submitted for total metals analysis, in addition to dissolved metals. Surface soil samples could be collected from Area D. The source of mercury in the wastewater ponds, of zinc in one surface water sample (DW-E), and of barium in groundwater from the deep wells could all be further investigated. Water level measurements could be collected in all deep wells to determine how much the wells may have recovered since their last measurements.

Details of these recommendations are further described in the remaining comments.

Drainage ditch sediments (see comment number 37); surface soil samples from Area D (see comment number 74); source of mercury in wastewater treatment ponds (see comment number 77); zinc in water sample DW-E (see comment number 134); barium in bedrock groundwater (see comment numbers 72 and 73); and water level measurements (see comment number 44) are all subsequently discussed in the following responses. A summary of additional work recommended for the site is contained in Attachment 1 of this response.

SECTION TWO COMMENTS

15. **Section 2.1, Page 2-1, Paragraph 1: Please list the types and quantities of chemicals that the facility produced and manufactured while operated under both the National Distillers Products Corporation and U.S. Industrial Chemicals Company.**

The types of chemicals (sodium and chlorine) that the facility produced while operating under both the National Distillers Products Corporation and US Industrial Chemicals Company were the same as are presently produced. With the exception of sodium peroxide, which was intermittently produced from 1950 to 1979, sodium and chlorine are the only products that have ever been manufactured at the RMI Sodium Plant. This information will be clarified in Section 2.1, page 2-1, paragraphs 1 and 3 in the revised RFI report.

16. **Section 2.1, Page 2-1, Paragraph 2: Please provide a reference or source for the statement that prior to the initial acquisition of land parcels in the late 1940s, it is believed that no chemical manufacturing or processing was conducted at the site. Also, please state what the land was used for when owned by the Cleveland Electric Illuminating Company and miscellaneous private landowners.**

RMI Company's CERCLA 104 Response for the Fields Brook site, interviews with past and present employees, and historical aerial photographs were sources of this information. The land was used as an easement when owned by Cleveland Electric Illuminating Company and other areas owned by miscellaneous owners were idle or used for non-industrial purposes. This information will be added to Section 2.1, page 2-1, paragraph 2 in the revised RFI report.

17. **Figure 2-2, Page 2-5: The locations of surface water bodies (such as all drainage ditches, the french drain system, and the DS tributary) within and around the site needs to be better shown in this and other figures in the report. It is difficult to determine the locations of these waterways on the figures.**

Locations of surface water bodies in the vicinity of the site are shown in Figure 4-5; drainage ditch locations are shown in Figure 4-23; and, the french drain system is shown in Figure 3-2. The scale on other figures in the report are such that these features cannot be shown without being overly cluttered and, therefore, these features will not be added to other figures in the revised RFI report. However, reference to the above figures will be made as needed in the revised RFI report.

SECTION THREE COMMENTS

18. **Section 3.3, Page 3-3, Paragraph 1: Please state the criteria for selecting surface soil sample SS5-2 on which to conduct an organic priority pollutant scan.**

I never approved this.

As stated in the "Interim Report, RCRA Facility Investigation, RMI Sodium Plant, Ashtabula, Ohio" prepared by ECKENFELDER INC. for RMI (Interim Report, July 1988), priority pollutant scans of other environmental media at the site would be conducted. This additional analytical work was done in response to USEPA's request and included one surficial soil sample in the fill area north of the wastewater treatment ponds. The priority pollutant scan analysis of sample SS5-2 was conducted to fulfill this request. Because the Interim Report has been submitted to and approved by USEPA, Section 3.3, page 3-3, paragraph 1 will not be modified to reflect this comment in the revised RFI report.

19. **Section 3.4, Page 3-3, Paragraph 2: Please state how water or steam condensate collected from steam cleaning drilling equipment was disposed.**

All water and steam condensate collected from steam cleaning drilling equipment were placed in drums and subsequently disposed of in the wastewater treatment ponds with the exception of the decontamination wastes from wells 1S and 2S. These wastes were collected in drums and disposed by the GSX Company who was working for RMI. This information will be provided in Section 3.4, page 3-3, paragraph 2 in the revised RFI report.

20. **Section 3.4, Page 3-4, Paragraph 1: The last sentence states that each core was analyzed in the field with a portable HNu to detect the presence of volatile organics. However, the well logs in Appendix 2 show HNu reading only for wells RMI-1S and RMI-2S. Please address this discrepancy.**

Each core was analyzed in the field with a portable HNU to detect the presence of volatile organics. On the well logs in Appendix 2, only HNU readings that were above background were reported. Therefore, the well logs only show HNU readings for wells 1S and 2S because volatile organics were not detected above background in any other core samples with the HNU. This will be addressed in Section 3.4, page 3-4, paragraph 1 of the revised RFI.

Comment

21. **Section 3.4, Page 3-4, Paragraph 3: Please state the criteria for submitting soil samples from 1S at 15.1 feet, 2S at 6.0 feet, and 8S at 6.5 feet for VOC's, BNA's, and pesticides/PCB's analysis. If the criteria was based on field HNu readings, then state why the log for well RMI-8S in Appendix 2 does not show HNu readings. Also, state why a sample from RMI-2S was submitted from 6 feet when the HNu reading from that depth shown on its log in Appendix 2 was 11 ppm whereas HNu readings from 10 to 20 feet and 20 to 25 feet were 150 ppm and 130 ppm, respectively. It is apparent that more soil samples could have been submitted for organic pollutant analysis.**

As stated in the response to comment number 18, priority pollutant scans of other environmental media were conducted in accordance with the Interim Report (July 1988). Included was a priority pollutant scan on one subsurface soil sample from the fill area north of the wastewater treatment ponds (8S at 6.5 ft). In addition, it was stated in the Interim Report that representative soil cores, where positive detections were observed in field meters, would be submitted to the laboratory for organic analysis. As discussed in the response to comment number 20, an HNU response was seen only in samples collected from 1S and 2S. Priority pollutant scans for one sample from boring 1S and one sample from 2S were sufficient to characterize the organic contaminants indicated by the HNU. Because the Interim Report has been submitted to and approved by USEPA, Section 3.4, page 3-4, paragraph 3 will not be modified to reflect this comment in the revised RFI report.

22. **Section 3.5.1, Page 3-5, Paragraph 2: A 2 foot-thick bentonite seal should have been placed below the cement grout at each piezometer to better inhibit the potential for possible surface contaminants to more readily migrate vertically to the shallow groundwater.**

As stated in the Interim Report (July 1988), only the piezometer in the landfill (PZ-9) was specified to have a two foot thick bentonite seal. The remaining piezometers were not installed in known fill areas. However, the piezometers were intended to be temporary and will be abandoned in the near future (see Attachment 1). This will be recommended in the Executive Summary, page ES-10, of the revised RFI report.

23. **Section 3.5.2, Page 3-6, Paragraph 1: The report states these shallow monitoring wells, except for wells 1S and 2S, consisted of PVC screen and casing. However, the Work Plan stated that all shallow monitoring wells would consist of Teflon screen and casing. Please state why PVC was used instead of Teflon.**

As stated in the Interim Report (July 1988), all monitoring wells were to consist of PVC screen and casing. However, as stated in Section 3.5.2, page 3-6, first complete sentence of the RFI report, monitoring wells 1S and 2S were constructed of Teflon screen and casing due to the suspected high levels of organics at these locations. Because the Interim Report has been submitted to and approved by USEPA, Section 3.5.2, page 3-6, paragraph 1 will not be modified for the revised RFI report.

No, CLARIFY

24. **Section 3.5.2, Page 3-6, Paragraph 1: The report states that the wells were developed either by a combination of surging and bailing or by compressed air. Well logs in Appendix 2 show that all wells except 1S, 2S, and 11D were developed using compressed air. According to Page 88 of the RCRA Ground-Water Monitoring Technical Enforcement Guidance**

Document (TEGD), air should not be used to develop monitoring wells. Also, please state what development method was used for wells 1S, 2S, and 11D because no method is shown on the respective logs.

All wells except 1S, 2S, and 11D were developed using compressed air at slow rates to prevent any sandpack and formation damage. In addition, all wells were purged by bailing prior to each sampling episode. Therefore, the constituent concentrations would not likely be affected by the compressed air development method. Monitoring wells 1S and 2S were not developed due to the presence of organic compounds and well 11D was developed by surging and bailing. This information will be provided in Sections 3.5.2 and 3.5.3 and relevant well logs for the revised RFI report.

25. Section 3.5.3, Page 3-7, Paragraph 1: Please state why the deep monitoring wells were constructed of PVC when the Work Plan states that the wells would be constructed of Teflon.

See comment number 23.

26. Section 3.5.3, Page 3-7, Paragraph 1: Again, the report states that the deep monitoring wells were developed by surging and bailing or by compressed air. Compressed air is not an acceptable development method by the U.S. EPA. The well logs in Appendix 2 show that all deep wells except 11D were developed by compressed air. Please state the development method for well 11D.

See comment number 24.

27. Section 3.7, Page 3-8, Paragraph 1: Please state how each well was purged prior to sampling. Also, please state how the purged groundwater was disposed.

All wells were purged by bailing prior to each sampling event and this is stated on the groundwater sampling field data sheets in Appendix 3 of the

RFI report. The purged groundwater was placed in drums and subsequently disposed of in the wastewater treatment ponds with the exception of purge water from wells 1S and 2S. These waters were collected in drums and disposed by GSX. These details will be added to Section 3.7, page 3-8, paragraph 1 in the revised RFI report.

28. Section 3.7, Page 3-9, Paragraph 1: The report states that groundwater samples collected for metals analysis were field-filtered and metals results are expressed as "dissolved". Please state the criteria for analyzing groundwater samples for "dissolved" metals versus "total" metals (or unfiltered samples). It is recommended that total metals analysis be included in future groundwater sampling at this facility in addition to dissolved metals analysis. The purpose of sampling groundwater during an RFI is to determine the extent of contaminants possibly released from a site to the groundwater. The primary contaminants of concern at the RMI site are metals. Any metals that were possibly released to the groundwater may have eventually adsorbed onto surfaces of clay, silt, or fine sand particles in the aquifer. Filtering of the groundwater samples would have removed these particles thereby reducing the "actual" contaminant concentrations possibly released to the groundwater. Comparison of total metals versus dissolved metals concentration would give an indication of contaminant concentrations possibly released to groundwater that were adsorbed onto sediment particles. Also, please state what preservative was used on the groundwater samples for metals analysis.

As stated in the USEPA-approved "Quality Assurance Project Plan" prepared by ECKENFELDER INC. for RMI (June 1987), the groundwater samples for metals analysis were to be filtered in the field prior to preservation. As discussed in the meeting of May 9, although a comparison of total versus dissolved metals concentration may be useful in some instances (e.g., when sampling highly fractured bedrock aquifers), it would provide little information at the project site due to the low permeability of the

glacial till which would tend to filter out any suspended particles. In addition, because many subsurface soil samples have been analyzed for metals, which provides information on the amount of metals available for transport in groundwater, it was determined that it was not necessary to collect both total and dissolved metals data for the project site. In addition, the total metals concentration may actually be more indicative of how completely the well could be developed (i.e., how much silt/clay was present in the well at the time of sampling). Therefore, additional groundwater sampling recommended for the project site (discussed further in Attachment 1), will not include analyses for total metals.

Nitric acid was the preservative used for the groundwater samples analyzed for dissolved metals analysis.

29. **Section 3.7, Page 3-10, Paragraph 1: Please state why well 1S could not be analyzed for major cations and metals. The concentrations of volatile organic compounds in this sample indicate it may have been possible to analyze this groundwater sample for major ions.**

The groundwater from well 1S could not be analyzed for major ions and metals due to the elevated concentrations of volatile organic compounds in this sample. The concentrations of trichloroethylene, tetrachloroethylene, and 1,1,2,2-tetrachloroethane were 63.1 ppm, 46.3 ppm, and 37.7 ppm, respectively. These levels of organics could potentially contaminate the laboratory and equipment and there could be a flammability hazard from other undetected organic constituents when digesting for metals analysis. In addition, any major ions and metals data obtained would be suspect due to interference from these high levels of organic compounds. This explanation will be added to Section 3.7, page 3-10, paragraph 1, for the revised RFI report.

30. **Section 3.7, Page 3-10, Paragraph 2: The report states that groundwater samples from monitoring wells 1S, 2S, 4S, and 4D (November 1988 sampling) and wells 3S, 4S, and 4D (January 1989 sampling) were subjected to an**

organic priority pollutant scan. However, the Work Plan states on Page 4-11 that wells 1S, 1D, 2S, and 2D would be subjected to an organic priority pollutant scan. Please address this discrepancy.

As stated in the RFI report (Section 3.5.3, page 3-6 and Section 6.6.1, page 6-29) and as discussed per telephone conversation with Ms. Francine Norling and the ECKENFELDER INC. field hydrogeologist prior to well installation, to prevent the potential downward migration of the chlorinated solvents into the bedrock zone, it was determined to complete wells 1S and 2S as shallow wells rather than bedrock wells as was originally planned. Groundwater samples from wells 4S and 4D were each subjected to a volatile organic priority pollutant scan as replacements for wells 1D and 2D due to their proximity to the southern property boundary. Reasoning for not installing wells 1D and 2D will be clarified in Section 3.5.3, page 3-6 for the revised RFI report. Using wells 4S and 4D as replacements for 1D and 2D for the priority pollutant scan will also be clarified in Section 3.7, page 3-10, paragraph 2 for the revised RI report.

31. **Section 3.8, Page 3-11, Paragraph 1: Please list the depths of each pond and at what depths the water samples were collected from the five wastewater treatment ponds. Explain what is meant by a "representative depth."**

Per observations made during the RFI, depths of the wastewater treatment ponds may be up to 14 ft deep. Drawings are not available for the wastewater treatment ponds and the depths of each pond are unknown. Sample descriptions (including depths at which samples were collected) are provided in the attached Appendix 3 (Attachment 2) which will be included in the revised RFI report (surface water sample descriptions were previously inadvertently omitted from Appendix 3). "Representative depth" indicates that samples were collected in a manner that would represent the water column at the location sampled. As discussed in Section 3.8, page 3-11, paragraph 1, samples were collected from

mid-depth from locations where adequate sample depth was present; otherwise, samples were collected from near the pond bottom. The first three complete sentences on page 3-11 will be changed in the revised RFI report as follows: "The Kemmerer was lowered into the water to a representative depth as follows: if the water was deep enough at the sample location (greater than approximately 2 ft), the samples were collected at mid-depth; otherwise, the Kemmerer was situated immediately above the pond bottom.

32. **Section 3.8, Page 3-11, Paragraph 2: The report states that each discrete pond sediment sample was "thoroughly mixed" before placing directly into an appropriate sample container. Because these sediment samples were analyzed for volatile solids content, the sediment should not have been "mixed" prior to placing in a container. Mixing of the sediment may volatilize any possible volatile solids components.**

According to the 17th edition of Standard Methods for the Examination of Water and Wastewater (1989), volatile solids content analysis is conducted using a well-mixed sample. The sample is dried in an oven at 103 to 105°C. The sample is then put in a muffle furnace at approximately 550°C and ignited. Stirring the sample prior to analysis will not interfere with the results of this analytical procedure. This analytical method is commonly used to give a rough approximation of the amount of organic matter present in the solid fraction of wastewater, industrial wastes, and soils and further clarification of this matter will not be provided in the revised RFI report.

33. **Section 3.8, Page 3-11, Paragraph 3: Please state if and how the pond water samples were preserved. Also, pond water and sediment sample descriptions are not contained in Appendix 3 as stated in the report. Only groundwater sample descriptions are contained in Appendix 3.**

Preservation of pond water samples is described in Appendix 3 (Attachment 2) which will be included in the revised RFI report. Surface

water sample descriptions were previously inadvertently omitted from Appendix 3 of the RFI report.

34. **Section 3.8, Page 3-12, Paragraph 2: The report states that water in three of the four french drain collection manholes was sampled. However, the Work Plan states on Page 4-12 that all four french drain collection manholes would be sampled. Please address this discrepancy. Also, please state if and how the french drain water samples were preserved.**

As discussed on page 3-12 and at the top of page 3-14 of the RFI report, all four french drain collection manholes were sampled. However, none of the manholes could be sampled with a dipper because of the configuration of the manhole cover and permanent pump installed in the manhole. Therefore, three manholes were sampled using a drill-powered centrifugal pump. However, the water level in the manhole located near Pond 5 (MHW-5) was too low to sample with the centrifugal pump. Therefore, plant personnel activated the permanent pump installed in the manhole and a sample was collected from the discharge pipe which is connected to the permanent pump and discharges to Pond 5. The liquid which was sampled in this way is the liquid that entered the manhole via the french drain system and is analogous to the samples collected from the other manholes. Manhole sampling procedures will be clarified in Section 3.8, pages 3-12 and 3-14 in the revised RFI report.

Preservation of manhole samples is described in Appendix 3 (Attachment 2) and will be included in the revised RFI report.

35. **Section 3.8, Page 3-14, Paragraph 1: The report states that the water level in the manhole near Pond 5 was too low to use the centrifugal pump. Please state the rationale for substituting this sample with a water sample collected from the discharge into Pond 5. The composition of water from this manhole may not be too similar to the discharge sample because passage of pond water through soils before entering the french**

drain system may alter its composition. It is stated in Page 4-12 of the Work Plan that a dipper may also be used to collect samples from the manholes. Please state why a dipper was not used.

See comment number 34.

36. Section 3.9, Page 3-14, Paragraph 1: Please state if and how the surface water samples were preserved.

Preservation of surface water samples is described in the attached Appendix 3 and will be included in the revised RFI report.

37. Section 3.9, Page 3-15, Paragraph 2: The report states that both a light colored and red-brown fine material was observed at the bottom of the ditch near Sample B. Please expound on the possible origin of this material. Sediment samples should have been collected from this ditch segment. Also, a summary of sample location descriptions is not contained in Appendix 3, as stated in the report.

The specific origin of sediment in this ditch location is unknown, but is likely to be the result of runoff and/or erosion of portions of the plant north of the ditch sample location. It should be noted that the red-brown fine material is believed to be an inorganic precipitate, probably resulting from the oxidation of iron. These observations will be added to Section 3.9, page 3-15, paragraph 2 in the revised RFI report.

According to the approved Work Plan, only surface water samples (not sediment) were to be collected from the on site drainage ditches. As discussed in the meeting of May 9 and previously discussed in the RFI report, it has been recognized that surficial soils contain constituents at the site at varying concentrations, and that some of these constituents may be transported to drainage ditches via erosion and/or runoff. The potential for erosion/runoff of constituents from site surficial soils and the evaluation of the need to remediate certain site

areas will be further addressed during the CMS report. Therefore, it is unnecessary to sample the ditch sediment to confirm this transport mechanism and collection of sediment samples from on site drainage ditches will not be recommended in the revised RFI report.

Sample location descriptions are provided in Appendix 3 (Attachment 2) which will be provided in the revised RFI report.

SECTION FOUR COMMENTS

38. **Figure 4-2, Page 4-4: The north arrow is missing from this figure.**

The north arrow will be added to Figure 4-2 in the revised RFI report.

39. **Section 4.1.4, Page 4-8, Paragraph 1: Verification may be required to determine if the well located approximately 3.8 km northeast of the plant boundary is not used as a source of drinking water.**

As discussed and agreed to in the meeting of May 9, it is not necessary to verify that the domestic well located northeast of the plant is not used as a drinking water source. This well is screened in the bedrock zone and is located cross-gradient, rather than downgradient, from the RMI Sodium Plant (groundwater flow direction in the bedrock zone is known to be towards Lake Erie in the vicinity of the project site). In addition, as further discussed in comment numbers 72 and 73, the bedrock zone is not affected by site activities.

40. **Section 4.2.2.1, Page 4-16, Paragraph 2: Please clarify what is being stated in the first sentence of this paragraph.**

The first sentence of this paragraph states "The hydraulic conductivity values in the wells screened across the weathered and unweathered till are indicative of the weathered till due to its much higher permeability". The difference in hydraulic conductivities could be as much as three orders of magnitude, therefore, because the measured hydraulic conductivities represent weighted averages of the conditions encountered by each well, they more closely reflect that of the higher conductivity weathered till due to its greater contribution to groundwater flow. The first sentence in Paragraph 2, Section 4.2.2.1, page 4-16 will be more clearly worded in the revised RFI report.

41. **Section 4.2.2.1, Page 4-16, Paragraph 3: Please state how close the RMI Extrusion Plant is to the RMI Sodium Plant. It would have been more appropriate to conduct the hydraulic conductivity tests on the unweathered till at the RMI Sodium Plant rather than using data from the Extrusion Plant because the RMI Sodium Plant is the focus of this study, not the RMI Extrusion Plant. Data specific to the site would be more appropriate.**

The RMI Extrusion Plant is located approximately 1/2 mile from the RMI Sodium Plant. The hydraulic conductivities of the unweathered till at the Extrusion Plant are representative of those found in glacial till in this area. For instance, as discussed in the meeting of May 9, the unweathered Ashtabula Till and Maumee Till in nearby Erie, Pennsylvania have hydraulic conductivities of 8.3×10^{-7} cm/sec and 1.8×10^{-7} cm/sec, respectively, which indicate that hydraulic conductivity values measured at the Extrusion Plant (ranging from 5.1×10^{-8} to 2.4×10^{-7} cm/sec) are characteristic of the general area. Although perhaps it would have been more appropriate to use data specific to the site, a decision was made in the field, with USEPA concurrence (per telephone conversation with Ms. Francine Norling), to screen the shallow wells across the weathered till/unweathered till rather than only in the unweathered till. Section 4.2.2.1, page 4-16, paragraph 3 will be modified to reflect the proximity of the RMI Extrusion Plant in the revised RFI report.

42. **Section 4.2.2, Page 4-16, Paragraph 4: Please state if the shale logged at wells 4D and 5D was fractured or possibly contained a sand lens to result in the higher hydraulic conductivity values calculated for those wells.**

The bedrock was drilled with a roller-cone bit (as stated in Section 3.5.3, page 3-7 of the RFI report) and no bedrock cores were obtained. Therefore, it is not known if the shale at wells 4D and 5D is

fractured, although fractures are relatively common in the uppermost sections of shale formations such as the Chagrin shale. It is unlikely that a sand lens would be present in the shale. Therefore, Section 4.2.2, page 4-16, paragraph 4 will not be modified for the revised RFI report.

43. **Section 4.2.2.2, Page 4-18, Paragraph 3: Please explain how the presence of a dense non-aqueous phase liquid (DNAPL) would result in a water table elevation above ground surface.**

See comment number 88.

44. **Section 4.2.2.2, Page 4-24, Paragraph 4 to Page 4-25, Paragraph 1: Because water levels had not sufficiently recovered in deep wells 7D, 9D, and 11D, it is recommended that water level measurements be collected in all deep wells (4D, 5D, 7D, 9D and 11D) to determine how much these wells may have recovered since their last measurements. This information would be needed to better determine the "true" piezometric surface of groundwater in the bedrock wells.**

Because water levels had not fully recovered in several bedrock wells during the RFI, it is agreed that water level measurements should be collected in all deep wells to better assess the piezometric surface of the bedrock groundwater as discussed in Section 4.2.2.2 of the RFI report (additional water level measurements are further discussed in Attachment 1). The recommendation for additional water level measurements will also be included in the Executive Summary, page ES-10, of the revised RFI report.

45. **Section 4.2.3, Page 4-29, Paragraph 2: The concentration of organics in groundwater from well 1S indicate it may have been possible to analyze this groundwater sample for major ions.**

See comment number 29.

check G.W. class - issue

46. Section 4.2.4.1, Page 4-35, Paragraph 2: Because of the presence of the sand lens at the south end of the site property, it could be appropriate to subdivide the classification review area (CRA) into three groundwater units instead of two. The uppermost water-bearing zone could be further subdivided into two units, the weathered till zone and the unweathered till zone containing the sand lens under confining pressure. Factors other than groundwater type (saline vs. fresh water) such as hydraulic conductivity should also be used to determine how to subdivide the groundwater units. A mean hydraulic conductivity (k) of 8.1×10^{-8} cm/sec. was assumed for the unweathered till zone. However, it is highly unlikely that this k value is indicative of the sand lens. The confined sand lens could also be considered as a third groundwater unit separate from the weathered and unweathered till zone.

According to the USEPA guidance entitled "Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy" (USEPA, 1986a; as referenced in Section 4.2.4), groundwater units are delineated on the basis of three types of boundaries: 1) permanent groundwater divides, 2) thick, laterally extensive, low permeability geologic units, and 3) permanent fresh water-saline water contacts. Water within a groundwater unit is inferred to be highly interconnected and, therefore, a common use and value (and, therefore, a common protection strategy) can be determined. In addition, boundaries separating waters of different classes must coincide with boundaries of groundwater units. None of the types of boundaries described above are present to delineate the sandy till, the weathered till, or the unweathered till from the overall till unit itself. These features are hydraulically connected and cannot be classified as separate groundwater units. This information will be added to Section 4.2.4.1, page 4-35, paragraph 2 in the revised RFI report. As discussed in the meeting of May 9, the "sand lens" present at the RMI Sodium Plant is actually a silty sand, sometimes containing clay, and forms gradational contacts with the surrounding till. The description of

the sand lens in Section 4.2.1.1, page 4-14, paragraph 3 will be revised to more accurately describe the sandy till zone in the revised RFI report.

As discussed in Section 4.2.4.3, page 4-42, paragraph 2 and as shown in Table 4-1, the hydraulic conductivity value used for the weathered till zone is the geometric mean of hydraulic conductivity values measured in wells screened across the weathered/unweathered till interface (which are indicative of the weathered till due to its much higher permeability) and the hydraulic conductivity value measured for well 8S, which is screened across the sandy till zone (a footnote will be added to Table 4-1 to indicate that well 8S is screened in the sandy till zone in the revised RFI report). Therefore, the hydraulic conductivity value used to represent the weathered till zone takes into account the presence of the localized sandy till zone.

47. **Section 4.2.4.1, Page 4-35, General Comment: Although it is possible that activities at the RMI Sodium Plant could not impact the bedrock water-bearing zone, it would be appropriate to determine its classification based on the procedure followed for the shallow water-bearing zone.**

According to the USEPA guidance on groundwater classification referenced in comment number 46, above, a classification decision is made only for the groundwater unit or units potentially affected by site activity. Because the bedrock unit is not affected by activity at the RMI Sodium Plant site (see comment numbers 72 and 73), it was not included in the groundwater classification procedure. The last sentence of the third complete paragraph on page 4-38 will therefore be modified in the revised RFI report as follows "... a classification decision will be made for this unit only, per USEPA guidance (USEPA, 1986a)."

48. **Section 4.2.4.2, Page 4-38, Paragraph 1: Figure 4-18 does not provide the locations of the four wells that are located within the CRA. Figure 4-18 is a Piper Trilinear Diagram on Page 4-34.**

Figure 4-20 (not Figure 4-18) provides the locations of the four wells located within the CRA. This reference on page 4-38 will be corrected in the revised RFI report.

49. **Section 4.2.4.3, Page 4-41, Paragraph 3: As stated in a previous comment, it would have been more appropriate to conduct hydraulic conductivity tests on the unweathered till at the RMI Sodium Plant versus using data from the RMI Extrusion Plant.**

As discussed in comment number 41 (and referenced in Section 4.2.4.3, page 4-41, paragraph 2) hydraulic conductivity data are not available for the unweathered till zone at the RMI Sodium Plant. Therefore, data from wells installed in the unweathered till zone at the RMI Extrusion Plant were used instead. It was determined that this information does not require further clarification in the revised RFI report. However, Section 4.2.4.3, page 4-41, paragraph 3 will be modified to reflect the proximity of the RMI Extrusion Plant in the revised RFI report.

(50) comment

Section 4.2.4.3, Page 4-44, Paragraph 5: The report should mention that if the uppermost groundwater partially discharges to drainage ditches, then any contamination of the groundwater caused by the site may ultimately reach Lake Erie, which is used as drinking water, via Fields Brook and the Ashtabula River. This possible contaminant transport route should be mentioned in the report.

As discussed on Section 4.2.2.2, pages 4-18 and 4-23 in the RFI report, it is acknowledged that at least a portion of the groundwater in the water table zone discharges to ditches on site including the DS Tributary to Fields Brook. However, as stated on p. 4-44 (and also discussed in Section 4.2.4.2), there are no ecologically vital areas in the CRA and no watershed protection areas for public water supply reservoirs (i.e., Lake Erie) in the CRA, which are two criteria needed to classify groundwater as Class IIIA. Paragraph 5 of page 4-44 of the RFI report is simply a

summary of the preliminary surveys conducted under the Class IIIA classification procedure; therefore, it was determined that this information does not require further clarification for the revised RFI report.

51. Section 4.4.1, Page 4-47, Paragraph 4: The last sentence cites a U.S. EPA reference that states sections of Fields Brook flow over bedrock. However, logs from the deep wells on-site indicate that the shallowest depth to bedrock on-site is approximately 45 ft. Please address this discrepancy (is bedrock that shallow south of the site, is stream valley deeply incised, etc.).

Fields Brook is some distance south from the site, and cross sections constructed for the site indicate that bedrock is more shallow in this direction. Fields Brook has been observed to flow over bedrock south of the site and is somewhat incised. The purpose of the paragraph was to convey that the characteristics of Fields Brook vary along its length; therefore, no further clarification will be provided in the revised RFI report.

52. Figure 4-21, Page 4-49: The north arrow and a scale is missing on this figure.

A north arrow and scale will be added to Figure 4-21, page 4-49, in the revised RFI report.

53. Section 4.4.4, Page 4-56, Paragraph 3: The last two sentences state that except for zinc, tin, and cadmium, the greatest concentrations of inorganics in sediment samples collected from station number 214 occurred at depths below six inches. However, in looking at the data in Table 4-9, the report should note that although the concentrations of chromium, barium, copper, nickel, vanadium, and mercury in the 6-12 inch interval were higher than the 0-6 inch interval, the concentrations of these sample constituents in the 0-6 inch interval was higher than the

12-20 inch interval. The last two sentences of this paragraph imply that the concentrations of these six constituents in the 0-6 inch interval were the lowest of the sampled intervals. The report could state the highest inorganic concentrations observed in each sampling interval (0-6 inch, 6-12 inch, and 12-20 inch).

The purpose of this statement was simply to indicate that maximum concentrations measured for the majority of the inorganic constituents occurred at depths greater than 6 in. This statement is correct and it is unnecessary to state the highest concentrations observed in each sampling interval; therefore, this additional information will not be provided in the revised RFI report.

54. Section 4.6.2.1, Page 4-67, Paragraph 3: The report should reference the information given on what products and wastes are produced by the Detrex facility.

The reference is given at the end of this paragraph on page 4-67 (USEPA, 1985).

55. Section 4.6.2.1, Page 4-70, Paragraph 1: If known, please state the characteristics of the sludges stored in older lagoons on the Elkem Metals complex.

The characteristics of the sludges in the lagoons on the Elkem Metals complex are unknown, therefore additional information will not be provided in the revised RFI report.

SECTION FIVE COMMENTS

56. Section 5.2.1.1, Page 5-4, Paragraph 1: The third sentence states that cell bath waste is EP Toxic for barium and possibly cadmium and lead and therefore is considered a hazardous waste. However, in the first paragraph at the top of Page 5-4, it states that waste piles were used for the disposal of non-hazardous wastes including cell bath wastes. Please address this discrepancy.

This sentence should read "Waste piles were used from 1950 to 1981 for the disposal of solid wastes including brick, rubble, salt dissolver wastes, anode butts, and cell bath wastes.". Page 5-4 will be changed accordingly in the revised RFI report.

57. Section 5.2.1.1, Page 5-5, Paragraph 2: The report states that the four wells installed by Herron Consultants included a long sand-pack section which could have served as a pathway of downward contaminant migration. This scenario holds true for the piezometers that were installed on-site by ECKENFELDER INC. for purposes of this RFI (see previous comment for Section 3.5.1, Page 3-5, Paragraph 2). Also, based on the four wells installed by Herron, the groundwater flow direction was found to vary from southwest to northwest. Because four wells were used to determine groundwater flow direction and the direction was found to vary, it is possible that Herron did not install enough wells to adequately determine groundwater flow direction in the vicinity of the closed landfill.

All of the Herron wells were installed directly in the closed landfill. The Herron observation wells consisted of 15 ft of perforated PVC pipe and a long sand pack section. The piezometers installed by ECKENFELDER INC. were described in comment number 22, and as noted, were intended to be temporary and will be abandoned in the near future (Attachment 1). More wells and piezometers were installed by ECKENFELDER INC. because it was recognized that Herron did not install enough wells to adequately determine groundwater flow direction in the

vicinity of the closed landfill. Because paragraph 2 of Section 5.2.1.1 serves only to provide historical perspective on the closed landfill, this additional information will not be provided in the revised RFI report.

58. **Section 5.2.1.1, Page 5-5, Paragraph 3: Please provide the analytical data indicating the presence of chlorinated organics in the samples as an Appendix to this report.**

The analytical report indicating the presence of chlorinated organics in samples collected from the ditch in September 1981 will be included in Appendix 7 of the revised RFI report.

59. **Section 5.2.1.1, Page 5-6, Paragraph 1: Please state if the red-colored liquid observed on the eastern side of the landfill on June 26, 1986 was similar in any way to the dark red liquid observed on September 30, 1981 in the bottom sediments of the drainage ditch. Please state whether the red-colored liquid appeared to originate from the landfill. If so, please provide any possible scenarios on the liquid's origin. Analytical data provided in Appendix 7 indicates that this liquid was analyzed for the concentrations of several metals only. Please state why an organic analysis was not performed on this liquid sample.**

The liquid sampled in 1986 and the liquid sampled in 1981 are not believed to have any chemical similarity. The samples collected in 1986 were obtained from the eastern side of the landfill and had no odor; samples collected in 1981 were from the ditch south of the landfill and had a strong organic odor. The materials also had significantly different appearances. Analyses of the sample collected in 1981 revealed that it contained trichloroethylene (1.4 percent), tetrachloroethythene (1.0 percent), and tetrachloroethane (29.3 percent). This dark red liquid observed in 1981 is believed to be the result of migration of chlorinated solvents from an off site source. The red-colored liquid observed in 1986 appeared to be the result of oxidation of inorganics

placed in the landfill. Section 5.2.1.1, page 5-6, paragraph 1 will be revised to more clearly indicate the difference between these two liquids in the revised RFI report. As discussed in comment number 58, the 1981 analytical report will be included in Appendix 7 of the revised RFI report.

The samples collected in 1986 were analyzed only for inorganics because only inorganics had been used or produced the Sodium Plant and the appearance and odor of the samples caused no reason to suspect organic compounds. Because it was suspected that high sodium chloride content in the samples would interfere with metals analyses, the samples were analyzed using several methods in order to develop an acceptable analytical method. This information will be added to Section 5.2.1.1., page 5-6, paragraph 2 in the revised RFI report.

60. **Sections 5.2.1.4 and 5.2.1.5, Page 5-7: If known, please state the earliest year which wastes were deposited on the surface of these areas as fill.**

The earliest time period during which wastes were deposited on the surface of fill area northeast and northwest of the closed landfill is estimated to be the 1950s and 1960s, respectively. This information will be added to Sections 5.2.1.4 and 5.2.1.5, page 5-7 in the revised RFI report.

61. **Section 5.2.2.1, Page 5-8, Paragraph 1: Please provide the thicknesses of compacted clay with which the wastewater treatment ponds were constructed.**

The thickness of the compacted clay with which the wastewater treatment ponds were constructed is unknown.

comment

(62.) **Section 5.2.3, Page 5-11, Paragraph 1: Please explain in more detail why the process units described in this section were not classified as "areas of concern" for the RFI.**

RMI's RCRA permit for the Sodium Plant mistakenly identified the abandoned pond east of the closed landfill as a potential SWMU at the facility. This pond was unfortunately again mistakenly identified in RMI's revised "Certification Regarding Potential Releases from Solid Waste Management Units" transmitted to USEPA and Ohio EPA in late September 1986, as were the east and west brine ponds. However, none of these process units have ever been used for storage of hazardous or solid waste material. As discussed in Section 5.2.3.1 of the RFI report, the abandoned pond has only contained leach brine as have the east and west brine ponds (Section 5.2.3.2 of the RFI report). As such, these ponds have never contained known hazardous constituents. In addition, as discussed in the Interim Report (July 1988), it was confirmed that the abandoned pond is not a SWMU, based on RMI's CERCLA 104 Response. Therefore, these process units should not be classified as "areas of concern".

As discussed in Section 5.2.3.3, the Ashco Reservoir is an impoundment that receives lake water from Lake Erie and has not been used for any other purpose. Therefore, no known hazardous constituents are present in the Reservoir, and it should not be classified as an "area of concern".

63. **Section 5.3.3, Page 5-14, Paragraph 1: The last sentence should read "Photolysis of lead and mercury <u>compounds</u>...". In addition, photolysis is an important process for silver compounds.**

The word "compounds" will be added to the sentence in Section 5.3.3, page 5-14, paragraph 1 in the revised RFI report. Although photolysis of silver is an important process in the photographic industry, it is not an important process with respect to the aquatic fate of silver according to the reference cited on page 5-14 (USEPA, 1979).

64. **Section 5.3.3.5, Page 5-27 Paragraph 1: The second sentence should read "Of the chemicals of concern, only in cases of lead and mercury compounds is photolysis an important process." Photolysis is also an important process for silver compounds, in addition to lead and mercury compounds.**

The word "compounds" will be added to the sentence in Section 5.3.3.5, page 5-27, paragraph 1 in the revised RFI report. As stated above, although photolysis of silver is an important process in the photographic industry, it is not an important process with respect to the aquatic fate of silver according to the reference cited on page 5-14 (USEPA, 1979).

65. **Section 5.3.3.5, Page 5-27, Paragraph 2: The second sentence should read "...are lead oxides and halogenated lead compounds."**

In Section 5.3.3.5, page 5-27, paragraph 2, this sentence will be revised as "The ultimate products of photolysis of lead compounds in the atmosphere are lead oxide and the halogens." in the revised RFI report, in accordance with the reference cited on page 5-14 (USEPA, 1979).

66. **Section 5.3.4, General Comment: For most of the metals addressed in this section, the common range of the metal is given for soils in the Ashtabula area. Please state if the data is specific to the City of Ashtabula, Ashtabula County, northeast Ohio, etc.**

The values were taken from Shacklette and Boerngen, 1984, which is a US Geological Survey publication in which metal concentrations are plotted on maps of the United States. The values chosen were those which were plotted in the vicinity of Ashtabula, Ohio. Therefore, reference will be made to "northeast Ohio in the vicinity of Ashtabula County" wherever the common range of metals is given for soils in Section 5.3.4 instead of referring to "the Ashtabula area".

SECTION SIX COMMENTS

67. **Section 6.1.1.1, Page 6-1, Paragraph 1: As stated previously in the comment for Section 4.2.3, Page 4-29, Paragraph 2, the concentration of organics in groundwater from well 1S indicate it may have been possible to analyze this groundwater sample for metals.**

See comment number 29.

68. **Section 6.1.1.1, Page 6-3, Paragraph 1: Because chromium was detected in well 6S at values higher than those from considered "background values", it's presence should be discussed.**

It was stated in the RFI report that "chromium was detected in all wells (except 6S) in amounts approximately equal to or below background values...". This statement was made because chromium was <u>not</u> detected in well 6S, not because it was present at higher concentrations than background. The last sentence on page 6-3, paragraph 1 will be modified for the revised RFI report to read "With the exception of well 6S (in which chromium was not detected), chromium was present in amounts approximately equal to or below background values in all wells. Therefore, chromium does not warrant further discussion."

69. **Section 6.1.1.1, Page 6-3, Paragraph 2: Designating wells 9S and 10S as background wells may not be appropriate because these wells aren't upgradient to the entire site and both may be somewhat downgradient of SWMU's. In addition, the concentration of chromium in these wells are higher than most samples collected from other wells. Therefore, wells 9S and 10S should not be considered background. If possible, "background" wells should be installed immediately upgradient of the site in an area not downgradient from or impacted by known waste disposal activities.**

As discussed in Section 6.1.1.1, page 6-3, paragraph 2, monitoring wells 9S and 10S may not be upgradient to the entire site due to the complex

shallow groundwater flow pattern. However, they are the wells furthest from the SWMUs and are in areas that have not been impacted by the SWMUs. Background wells truly upgradient to the entire site would have to be located off site. Major ion data (Figure 4-15, page 4-30) indicate that the background wells (9S and 10S) have distinctively different groundwater chemistry than the wells associated with the SWMUs and indicate that these wells are representative of conditions that are background to the SWMUs. This additional information will be provided on page 6-3, paragraph 2 in the revised RFI report.

The concentrations of chromium in wells 9S and 10S (ranging from BMDL to 13.6 ppb) are not substantially higher than samples collected from other wells (ranging from BMDL to 14.5 ppb). Furthermore, the highest chromium concentration in the background wells, 13.6 ppb in 9S, is suspect because it was present only below detection limits in the previous sampling round and in the duplicate sample split of the same sampling episode. Because this information is readily available (see Table 6-1), Section 6.1.1.1, page 6-3, paragraph 2 will not be modified to reflect this comment in the revised RFI report.

70. **Section 6.1.1.2, Page 6-3, Paragraph 1: The direction of contaminant migration appears to radiate outward from the mounded groundwater in the vicinity of the five ponds near the eastern property boundary. Therefore, the possible on-site contaminant migration directions need to be more accurately defined by installing and sampling additional groundwater wells in the eastern and southern portions of the property.**

Although the site has a complex groundwater flow pattern, it has been sufficiently defined with the exception of the eastern property boundary. Recommended additional investigations in this area were discussed on page ES-10 of the RFI report and have been further defined in Attachment 1 of this response. As discussed in the meeting of May 9, it is believed that additional monitoring wells and piezometers in the southern portion of the property would not significantly supplement the current delineation or evaluation of groundwater flow.

71. **Section 6.1.1.2, Page 6-6, Paragraph 2: If detailed information is lacking as to the quantity of groundwater discharging into the drainage ditch east of the wastewater treatment ponds, please state how it is known that groundwater discharges to this ditch at all. As recommended in this report, monitoring wells and possibly piezometers need to be installed in this portion of the site to better define possible groundwater discharge to the ditch. In addition, please state how the coal pile located east of the ditch could complicate groundwater flow patterns in the area.**

Additional investigations are planned for the eastern portion of the site to gain information on groundwater flow direction and gradient and the quantity of groundwater discharging into the drainage ditch east of the wastewater treatment ponds. The coal pile located east of the ditch could complicate groundwater flow patterns in a number of ways; for example, by acting as a zone of recharge or by possibly acting as an area where recharge of the groundwater is prevented. Additional investigations planned for the eastern portion of the site will further define the influence of the coal pile on groundwater flow patterns at the site. Additional investigations in this area are further discussed in Attachment 1 of this response. The recommendations on page ES-10 will be revised to reflect all planned work in the revised RFI report.

72. **Section 6.1.2, Page 6-7, Paragraph 1: Because the concentrations of barium, cadmium, and chromium in the bedrock "background" well 11D were higher than those detected in all other bedrock wells, the designation of well 11D as background may not be appropriate.**

The direction of bedrock groundwater flow is expected to be north towards Lake Erie as is the case at the nearby RMI Extrusion Plant, approximately ½ mile from the Sodium Plant facility. Under these conditions, well 11D is upgradient relative to the RMI Sodium Plant SWMUs and represents background conditions for the bedrock zone.

73. Section 6.1.2, Page 6-7, Paragraph 2: If the levels of barium in the bedrock groundwater are higher than those documented to naturally occur, then the barium concentrations cannot represent background as stated in the report, especially if the levels are result of off-site sources. Also, not enough information has been collected to concretely state that bedrock groundwater is not affected by SWMU's on site. It is of concern that elevated concentrations of barium have been detected in the bedrock groundwater and barium is one of the major waste constituents at the RMI Sodium Plant. The presence of barium in bedrock groundwater at the site needs to be more adequately addressed.

The presence of barium in the deep bedrock groundwater does not necessarily indicate a connection with the SWMUs on site. As stated in the RFI report (Section 4.2.2.2, page 4-23, first complete paragraph), based upon the low permeability and considerable thickness of the unweathered glacial till, and the relatively small hydraulic gradient between the bedrock and the shallow aquifer, it is apparent that only a minimal downward component of flow exists between the two water bearing zones. In addition, major ion data (discussed in Section 4.2.3, page 4-29 and indicated on Figure 4-15, page 4-30) demonstrate that the bedrock wells have a distinctively different groundwater chemistry than the shallow wells.

Barium/chloride ratios in the bedrock and shallow aquifers are also inconsistent with hypothesis that the deep groundwater had been impacted by the shallow groundwater. Because chloride is a very conservative ion (i.e. is not readily attenuated), chloride would migrate along a downward vertical gradient more quickly than barium, which may be attenuated more readily than the chloride ion. Barium in the deep groundwater occurs at higher concentrations than in shallow groundwater while chloride concentrations in the deep groundwater are much lower than in shallow groundwater. These inverted ratios indicate that the barium in the deep

groundwater could not have originated from the shallow aquifer, but rather is naturally occurring. This discussion will be elaborated on in Section 4.2.3 in the revised RFI report.

74. **Section 6.2.1, Page 6-7, Paragraph 1: Please state if it would have been possible to collect surface soil samples from the inferred locations of Area D. If so, surface soil samples should be collected from Area D to better characterize the potential of releases from this unit via surface water runoff.**

Surficial soil samples were collected in accordance with the approved RFI Work Plan. With the exception of the southernmost portion of Area D, surficial soil samples would not be indicative of fill materials because of prior excavation of fill materials in this area. The southernmost portion of Area D is gravel-covered and receives a great deal of vehicular traffic. Additional field work recommended for areas east and north of the wastewater treatment ponds (further discussed in Attachment 1) will define contribution of runoff and/or erosion from these areas. Therefore, collection of surface soil samples from the inferred locations of Area D will not be included as recommended additional work in the revised RFI report.

75. **Table 6-3, Page 6-10: Please state the units of measure for mean values given (ppm, ppb?).**

The unit of measure for the mean values given is log-transformed parts per million (ppm). This information will be provided as a footnote to Table 6-3 in the revised RFI report.

76. **Section 6.2.2, Page 6-14, Paragraph 2: For reasons stated in a previous comment (Section 3.4, Page 3-4, Paragraph 3), please state the criteria for conducting a priority pollutant scan on the soil samples from 1S, 2S, and 8S.**

See comment number 21.

77. **Section 6.3.1, Page 6-18, Paragraph 1: The potential source of the mercury detected in the water from Ponds 1 through 4 needs to be further investigated.**

As discussed in the meeting of May 9, the source of mercury in pond water is unknown, and mercury is not (and has never been) used in the RMI Sodium Plant manufacturing processes. However, mercury may naturally occur in trace amounts in the Lake Erie water supply and in the brine solution used at the Plant. Therefore, the last sentence in Section 6.3.1, page 6-18, paragraph 1 will be changed to: "As such, the source of mercury is unknown, but may be present in low concentrations in raw materials (i.e., water supply or brine solution) used at the plant." in the revised RFI report.

78. **Section 6.3.1, Page 6-18, Paragraph 3: If one sample of pond sediment had "appreciable levels" of chromium, then please state why chromium is not a "potential concern."**

The sixth and seventh sentences in Section 6.3.1, page 6-18, paragraph 3 will be revised to read: "The chromium concentrations ranged less than an order of magnitude, from 4.2 mg/kg to 17.5 mg/kg, with the maximum concentration (17.5 mg/kg) measured in sample PS-1. Because chromium concentrations measured were low, chromium does not appear to be in the pond sediment at levels of potential concern." in the revised RFI report.

79. **Section 6.3.1, Page 6-20, Paragraph 3: The report states that water from the collection manhole MHW-5 (near Pond 5) for the french drain was collected. However, on Pages 3-12 and 3-13, the report states that the water level in the manhole near Pond 5 was too low to be collected so a sample was collected from discharge into Pond 5. Please address this discrepancy.**

See comment numbers 34 and 35.

80. Section 6.3.1, Page 6-22, Paragraph 3: The report states that most metals concentration for manhole MHW-5 are the highest for the four manhole samples. In light of the preceding comment, this would be expected if a sample was collected of the discharge into Pond 5 instead of from manhole MHW-5 as stated on Pages 3-12 and 3-13. Therefore, this is not a valid comparison. Concentrations of parameters from manholes MHW-1, -2, and -4 should be compared without including MHW-5.

See comment numbers 34 and 35.

81. Section 6.4, Page 6-27, Paragraph 2: If it is possible that small quantities of metals sorbed onto the surficial soils may migrate via fugitive dust, then air monitoring for metals should be conducted. Please elaborate on the potential hazard associated with fugitive dust.

See comment numbers 102, 124, and 127.

82. Section 6.5, Page 6-27: Because volatile organics have been detected in the groundwater and soils along the southern property boundary, then the potential for subsurface gas generation should be addressed in the RFI even if the volatile organics may originate from an off-site source.

The intent of the RFI was to evaluate potential releases only from the SWMUs present at the RMI Sodium Plant facility. As was concurred in the May 9 meeting, it has been sufficiently demonstrated that the presence of organics on RMI Sodium Plant property is the result of off site releases (see also comment number 95). Therefore, subsurface gas generation will not be evaluated in the revised RFI report.

83. Section 6.6.1, Page 6-28, Paragraph 1: Please state what remedial actions were taken in an attempt to eliminate the dark red liquid observed in the bottom of the ditch. Please provide the analytical data indicating the presence of chlorinated organics.

The ditch was capped with clay after the dark red liquid was observed in the bottom of the ditch creating a shallower ditch. This information will be added to Section 6.6.1, page 6-28, paragraph 1 in the revised RFI report. Analytical data for the samples collected in 1981 will be included in Appendix 7 of the revised RFI report.

84. **Section 6.6.1, Page 6-28, Paragraph 2: Please state why this red-colored liquid was not analyzed for concentrations of organic constituents. Please elaborate if it appeared that the liquid originated from the landfill. It is difficult to explain the liquid coming from an off-site source if it was observed coming out of a landfill.**

See comment number 59.

85. **Section 6.6.1, Page 6-28, Paragraph 3: Please discuss the presence of volatile compounds detected with an HNu during drilling of piezometer PZ-9. It is of a concern because this piezometer was installed in the center of the landfill and the organics have only been detected in samples from the landfill's vicinity.**

The HNU was utilized in the breathing space and vicinity of the borehole (no soil headspace screening) during the drilling of the piezometers. A small amount of volatile organics (approximately 2 ppm) were detected with the HNU in PZ-9 at a depth of 19 ft compared to 15 ppm at a depth of 10 ft in piezometer PZ-8 adjacent to the southern edge of the landfill. Therefore, the first indications of volatile organics were below the fill material comprising the landfill which eliminates the landfill as a potential DNAPL source. Section 6.6.1, page 6-28, paragraph 3 will be revised to more clearly indicate the difference between PZ-9 and PZ-8, and Figure 6-3 will also be changed to reflect this information on the revised RFI report.

86. **Section 6.6.1, Page 6-29, Paragraph 1: If the dark red liquid encountered in the sand lens at the depths of 16 and 17 feet is similar to the red liquid found on the landfill, please discuss how this liquid reached the landfill's surface. Please state if the liquid's red color is indicative of particular volatile organic compounds. More data collected in the landfill vicinity would assist in determining whether the chemicals migrated from an off-site source. Please state if it's possible that these chemicals were dumped into the landfill some time ago without the knowledge of RMI Sodium Plant officials.**

The dark red DNAPL encountered in the sandy till is not similar to the red liquid found on the landfill in June 1986. However, it is very similar to the dark red liquid observed on September 1981 in the drainage ditch (see comment number 59). There is no indication that DNAPL is associated with the landfill. The chlorinated solvents observed in the ditch (1981) probably originated from off site surface water discharges to the ditch. This conclusion will be added to Section 6.6.1, page 6-29, paragraph 1 of the revised RFI report.

As stated in the response to comment number 59, the red color of the liquid observed on the landfill in 1986 appeared to be the result of oxidation of inorganic materials. The DNAPL red color is not indicative of a particular volatile organic compound, but is most likely caused by a combination of organic compounds.

It is believed that the DNAPL source and extent have been adequately addressed and that further sampling in the vicinity of the landfill is unnecessary (see comment number 95).

RMI does not, and has never used chlorinated solvents at the Sodium Plant. The Sodium Plant site is restricted and has extensive security devices, therefore, it is extremely unlikely that these chemicals were illegally

or inadvertently dumped into the landfill in the past. This will be further discussed in Section 6.6.1, page 6-29, paragraph 1 of the revised RFI report.

87. **Section 6.6.2, Page 6-31, Paragraph 1: Please state how the assumption can be made that a major portion of the sand body and therefore, the DNAPL, occurs to the south of the RMI site when no data, such as logs and sampling results of wells, was collected or provided. This assumption needs to be supported with data.**

In accordance with the approved RFI Work Plan, off site investigations were not conducted as part of the RFI investigation. These interpretations were made based upon extrapolation of the data collected and information obtained during the RFI concerning the potential off site source to the south. The occurrence of the DNAPL is further discussed in the response to comment number 95.

88. **Section 6.6.2, Page 6-31, Paragraph 2: The Groundwater Sampling Field Data Sheets for January 1989 sampling of wells 1S and 2S are not included in Appendix 3. Please provide a reference or an equation used to calculate the corrected piezometer surface for well 2S. Please rephrase the sentence "This piezometric head condition does not exist anywhere else on the RMI site" to "This piezometric head condition was not observed in the remaining groundwater wells on the RMI site."**

Wells 1S and 2S were not sampled in January 1989, therefore, Groundwater Sampling Field Data Sheets were not prepared for these wells for the January 1989 Sampling went.

The method used to calculate the corrected piezometric surface in well 2S was based on the ratio of the density of water (1 g/cm^2) to the density of DNAPL (1.58 g/cm^2). After further review of the data, we conclude that insufficient information on the elevation of DNAPL in the well was available to make the piezometric correction as presented. While the

water level measured in the well indicated a significantly elevated head relative to surrounding wells, the DNAPL thickness was not measured in the field and, therefore, the DNAPL thickness and resultant corrected piezometric surface may actually be less. This will be elaborated in the revised RFI report (Section 6.6.2, Page 6-31, paragraph 3).

The sentence "This piezometric head condition does not exist any where else on the RMI site" will be rephrased to read "This piezometric head condition was not observed in other groundwater wells on the RMI site", in the revised RFI report.

89. **Section 6.6.2, Page 6-31, Paragraph 3: Volatile organics may not have been detected in shallow wells 3S and 4S because neither well was drilled deep enough to encounter the sand lens in which the DNAPL was discovered at well 2S. Also, the DNAPL may not have been detected in groundwater from deep well 4D because the well was screened in the bedrock. Therefore, if the DNAPL was present in the sand lens at these wells, it would have been unlikely to detect it in the groundwater samples.**

Although it is possible for volatile organics to be present in the sandy till below wells 3S and 4S due to their configuration, there was no HNU response during the drilling of these wells above the sandy till as was the case while drilling 1S and 2S. In addition, during drilling of well 4D the sandy till was encountered and again there were no HNU readings above background. This information will be added to paragraph 3, page 6-31 of the revised RFI report.

90. **Section 6.6.3, Page 6-33, Paragraph 1: A summary of detectable constituents of subsurface soils is found in Table 6-10, not Table 6-9.**

This will be corrected on page 6-33 in the revised RFI report.

91. **Section 6.6.3, Page 6-33, Paragraph 2: In retrospect, it would have been appropriate to submit soil samples from depth shallower than the sand lens containing the DNAPL at wells 3S, 4S, and 4D. If volatilized**

compounds of DNAPL are migrating upward as stated, then the DNAPL, if present, may have been detected in shallower soil samples from these three wells. The HNu readings of the shallow soils at these wells, which were supposedly taken, were not included in the well logs in Appendix 2 (except for wells 1S and 2S). Please see earlier comment for Section 3.4, Page 3-4, Paragraph 1. Please address any potential for the DNAPL migrating downward, not upward.

As discussed in comment number 20, only HNU readings that were above background were reported. No volatile organic compounds were indicated by the HNU in shallower soils in borings 3S, 4S, and 4D.

The nature of the soils would be expected to dictate that the DNAPL will preferentially migrate laterally through the higher permeability sandy till, and not vertically through the underlying, low permeability clayey till. No significant downward migration is expected and this will be discussed in Section 6.6.3, page 6-33, paragraph 2 of the revised RFI report.

92. **Section 6.6.4, Page 6-33, Paragraph 2: If the volatile organic constituents (except trichloroethylene) detected in surface water samples were not detected in the groundwater and subsurface soils at wells 1S and 2S, then address the possible origin of these constituents in the surface waters.**

The volatile organic constituents (except trichloroethylene) detected in the surface water include 1,2-trans-dichloroethylene, 1,1,2-trichloroethane, and trichlorofluoromethane. These volatile organics were most likely not detected in the groundwater and soils at wells 1S and 2S because the detection limits were elevated due to the high organic concentrations in the samples. This fact will be reflected in Section 6.6.4, page 6-23, paragraph 2 of the revised RFI report.

93. Section 6.6.4, Page 6-34, Paragraph 2: The report seems to imply in this paragraph and elsewhere that because Fields Brook is a U.S. EPA Superfund site, that any possible effect of the site would not be of concern because Fields Brook is contaminated anyway. However, this potential fact is not relevant for the purposes of this RFI for the site. What is relevant is that releases of site contaminants may impact media off site, regardless of how contaminated the media (air, water, sediment, soil) may be. Although the RMI Sodium outfall to the DS tributary has no detectable amounts of organics, it does not preclude the possibility of another source on site (surface water runoff, possible upward migration of organics into tributary from sand lens under confining pressure, if plausible).

It was not our intent to imply that potential effects from the Sodium Plant site on Fields Brook are not of concern because Fields Brook is a Superfund site. RMI does not intend to contribute to the possible further degradation of Fields Brook, and potential off site releases of site contaminants that may impact media off site will be addressed in the Corrective Measures Study.

The RMI Sodium outfall to the DS tributary has no detectable amounts of organic compounds and there is no reason to suspect that other sources of organics may exist on site as a result of RMI activities.

As discussed further in comment number 95, organics present at the RMI site are believed to be the result of migration from off site sources.

94. Section 6.6.5, Page 6-34: Please state why HNu readings are not provided for the logs of all wells, piezometers, and borings in Appendix 2 (except wells 1S and 2S).

See comment number 20.

95. Section 6.6.6, Pages 6-34 and 6-35: Not enough information has been collected to reach the conclusion that the DNAPL found on the RMI site is the result of an off-site source, likely located to the south. Additional wells, piezometers and soil borings are needed in the vicinity of the closed landfill, especially to the south of RMI property, to better determine the local hydrogeologic regime and extent of contamination. Also, the report states that the major portion of the sand body and therefore, the DNAPL occurs to the south of the site. The extent of the sand body to the south of the site has not been defined. It is also possible that the sand body extends further north into the site than what is shown in Figure 4-7. Additional soil boring information is needed north of well 4D and south of well 7D and also south of the site to determine sand layer/lens extent. There are other uncertainties that need to be addressed, in addition to sand layer/lens and DNAPL extent, before the source of the DNAPL and its migration pathway can be adequately determined. These uncertainties include the following:

We believe that sufficient information has been collected to conclude that the DNAPL source is off site to the south. As was concurred in the May 9 meeting, this conclusion is based upon the following evidence:

- RMI does not and has never used chlorinated solvents at the Sodium Plant. In addition, the plant security precautions would eliminate the potential for illegal or unintentional disposal of organics on site.

- A chemical manufacturing facility, located on the southern border of the site, has historically discharged chlorinated solvents to Fields Brook and settling lagoons on their property. The lagoons, located immediately adjacent to the RMI Sodium Plant property, were not lined and were used for storage of wastes from the manufacture of solvents. Surface water runoff from these lagoons was ultimately discharged to

Fields Brook via drainage ditches. The documented wastes from these processes include trichloroethylene, chlorobenzene, tetrachloroethane, tetrachloroethylene, hexachlorobutadiene, and pentachloroethane. Several of these compounds were detected in elevated concentrations in the DNAPL from wells 2S and 1S and in the DS Tributary samples collected in 1981. The sources of this information were the Ohio EPA files, Northeast District Office, Twinsburg, Ohio and the USEPA CERCLA 104 Request for Information Response for the Fields Brook site.

- The DNAPL and its dissolved constituents have only been observed in the immediate vicinity of the southern boundary of the RMI property. The northernmost indication of organics was an HNU reading of 2 ppm at a depth of 19 ft in piezometer PZ-9. The only other wells and borings with detectable organic compounds were 1S, 2S, and PZ-8. This information further substantiates the conclusion that chlorinated solvents were not placed in the RMI landfill.

- The DNAPL has accumulated in a sandy till zone that extends off site to the south. There are two possible scenarios for the source of DNAPL. One very likely source is the unlined lagoons that could have discharged chlorinated solvents into the sandy layer through infiltration and seepage. The other potential source is the DS Tributary to Fields Brook that could have received outfall discharges and lagoon runoff from the manufacturing facility located on the southern border of the RMI Sodium Plant. These would both result in the saturation of the sandy till by the DNAPL through time. The DNAPL movement is controlled by the geometry of the sand layer and, therefore, could migrate north under the RMI property.

The specific elements of this comment have been addressed previously as referenced below:

1. Similarity of the dark red pools of liquid observed in the ditch on September 30, 1981 to the red liquid observed on the eastern side of the landfill on June 26, 1986.

   See comment number 59.

2. The possibility that the landfill may be the source of the DNAPL through past disposal of the DNAPL in the landfill that was unknown to plant officials.

   See comment number 86.

3. If the red liquid observed on the landfill was similar to the DNAPL, an explanation for why it appeared to originate from the landfill.

   See comment numbers 59 and 86.

4. The presence of volatile compounds detected with an HNu during drilling of piezometer PZ-9 which is located in the center of the landfill.

   See comment number 85.

5. The possibility that the DNAPL is present in the sand lens (shown in Figures 4-7 and 4-8) in the vicinity of wells 3S, 4S, and 4D. If present, the DNAPL could not have been detected in groundwater from wells 3S and 4S because the wells were not drilled deep enough to intercept the sand lens. The DNAPL could not have been detected in groundwater from well 4D because the well was screened in the deeper bedrock.

   See comment number 89.

6. The lack of HNu readings of soil provided in the well logs for wells 3S, 4S, and 4D (for soils shallower than the sand lens). If the DNAPL was present in the sand lens at these wells, and volatilized compounds were migrating upwards as postulated in the report, then the HNu may have possibly detected the presence of these volatiles in the shallower soils.

   See comment number 89.

7. The mechanism by which the DNAPL would migrate upward through the overlying clayey till of low permeability in the vicinity of well 2S. Also, an explanation for why the piezometric surface of only one well, 2S, extended above the groundwater surface.

   See comment numbers 88 and 91.

8. The mechanism by which the DNAPL would preferably migrate upward in the vicinity of well 2S instead of migrating along the sand body to the north of well 2S. It seems that if the migration of the DNAPL is controlled by sand body geometry, as postulated in the report, then it would preferentially migrate along the sand body to the north, and not vertically upward near well 2S.

   See comment numbers 86 and 91.

96. Section 6.7.1, Page 6-37, Paragraph 1: The second sentence should read "as discussed in Section 4.2.2, an unknown portion of groundwater in the vicinity of the closed landfill appears to discharge into the nearby drainage ditches and the DS tributary".

   This sentence will be changed to "As discussed in Section 4.2.2, a portion of groundwater in the vicinity of the closed landfill appears to discharge into the nearby drainage ditches and the DS Tributary." in the revised RFI report.

97. Section 6.7.1, Page 6-37, Paragraph 1: The report should note that if metals contained in the drainage ditches appear to be sorbed to sediments, then the ability for the sediments to adsorb metals may decrease with time because the sediments could increasingly become "saturated" with metals, and therefore lose "positions" on the sediment surfaces for metals to fill.

It is true that sediments may become increasingly saturated with metals such that they would lose their ability to absorb metals in a static system. However, the ditch system at the RMI Sodium Plant is dynamic and it is likely that erosion of surficial soils to the site drainage ditches (identified in Section 7.2.2, page 7-31 of the RFI as a potential transport mechanism for surficial soils, and discussed on page 7-35) would provide new "positions" for soil sorption. Either scenario is extremely speculative and, in the context of this paragraph (which is simply a presentation of a summary of potential contaminant releases), does not constituent a major technical issue or one that can be proved or disproved. Therefore, Section 6.7.1, page 6-37, paragraph 1 will not be altered to reflect this comment in the revised RFI report.

98. Section 6.7.2, Page 6-38, Paragraph 1: The report should state that cadmium will less likely adsorb onto ditch sediments during heavy rainfall and flooding events. Site contaminants could easily be transported off site through runoff into the flooded ditch and DS tributary. Also, transport of contaminants that may reach the drainage ditch from surface water runoff would not occur continuously but only during periods of sufficient precipitation. The ditch would receive "slugs" of site contaminants that may eventually be transported off-site by waters in the ditch. Therefore, even through contaminants were not detected in the ditch water sample, it is not correct to assume it was because of sorption onto ditch sediments. It is just as likely that the slug of contaminant that reached the ditch water was transported off-site. All surface water samples should be collected from the ditch